

SECTION 02265

TEMPORARY DUCTBANK SUPPORT AND PROTECTION

PART 1 - GENERAL

0.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies temporary ductbank support and protection systems.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 02240 - DEWATERING; for dewatering excavations.
 - 2. Section 02260 - EXCAVATION SUPPORT AND PROTECTION.
 - 3. Section 02300 - EARTHWORK; excavating and backfilling for existing utilities.

0.2 PERFORMANCE REQUIREMENTS

- A.** Design, furnish, install, monitor, and maintain ductbank support and protection system capable of temporarily supporting ductbanks over open excavations.
 - 1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and Design Calculations.
 - 2. Install temporary ductbank support and protection systems without damaging existing buildings, pavements, and other infrastructure or facilities adjacent to excavation.
 - 3. Provide vibration and deflection monitoring for the duration of use to ensure ductbank deflections and movements do not exceed its existing capacity.
 - 4. Prior to installation, establish survey benchmarks.
 - 5. During installation, regularly survey benchmarks, maintaining a log of surveyed elevations and positions for comparison with original elevations and positions. Immediately notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.
 - 6. The Engineer shall inspect all temporary ductbank support on a monthly basis unless otherwise directed by the MBTA.

0.3 SUBMITTALS

- A.** Shop Drawings: Prepared and stamped by a qualified professional engineer registered in the Commonwealth of Massachusetts.

1. Hangers may be synthetic web slings or steel rods or members. Spacing of the slings or hangers shall be as per the approved design calculations but shall not exceed 4 feet on center. Slings shall be a minimum of 3 inches wide.
- B.** Submit manufacturer's literature for all products provided under this Section.
1. Synthetic web slings used shall be the appropriate weight rating for the support system, including a minimum factor of safety of 1.5.
- C.** Design Calculations: Temporary ductbank support and protection system shall be designed and stamped by a professional engineer registered in the Commonwealth of Massachusetts and submitted to the MBTA and utility owner for approval prior to commencing the work.
1. Provide stamped calculations of all elements of the temporary support system verifying the system is within allowable stresses and deflections.
 2. All design loadings and codes shall be noted.
 3. Live loads used shall consider construction loads applied during the execution of the work as well as all other applicable live loads.
- D.** Work Plan: Provide a detailed work plan which identifies the sequence of installation, excavation, backfill, and removal; schedule of work; equipment; and site contacts.
- E.** Existing Condition Survey: Submit a survey which documents the following:
1. Location in horizontal and vertical planes relative to an established benchmark.
 2. Physical properties of the ductbank including length, width, depth, and construction type.
 3. Locations, extents, and details of existing ductbank defects including cracks, spalls, section loss, and other indications of distress.
- F.** Preconstruction Photographic and/or Video Survey: Submit a survey which accurately and completely represents the observable existing conditions of ductbank prior to installation of the temporary support system and ahead of performing any excavation which would remove the existing support of the ductbank.
- G.** Construction Monitoring Plan: Submit a detailed plan, prepared and stamped by a qualified professional engineer registered in the Commonwealth of Massachusetts, of the proposed method for monitoring the vibrations and/or deflections of the ductbank, as suitable for the project conditions, to the Engineer for approval prior to commencing with the work. Deflections shall not be allowed to exceed a maximum displacement of $L/360$, where L is equal to the unsupported span between temporary

support structures. The plan shall include, but not be limited to, specifications of equipment to be used, monitoring frequency and schedule, method for reporting monitoring data, thresholds and limiting values, contingency plan for exceedance of threshold and limiting values, and a contact list.

0.4 PROJECT CONDITIONS

- A.** Existing Utilities: Do not interrupt utilities serving facilities owned by the Authority or others unless approved in writing by the MBTA project office.
- B.** Project Site Information: A geotechnical report may have been prepared for this Project and will be available for information only. The opinions expressed in this report are those of the geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Authority will not be responsible for interpretations or conclusions drawn from this data.
 - 1. Make additional test borings and conduct other exploratory operations necessary for temporary ductbank support and protection.
- C.** Survey adjacent structures and improvements, employing a qualified professional engineer or land surveyor; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

0.1 MATERIALS

- A.** General: Provide materials that are either new or in serviceable condition.
- B.** Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C.** Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
- D.** Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- E.** Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- F.** Timber Piling: ASTM D 25, species listed in AWWA C3, pressure-treated in accordance with AWWA C3.

- G.** Seven Wire Strand: ASTM A 416, Grade 250 or 270, uncoated seven-wire, low-relaxation strand.
- H.** Grout: Suitable for service, minimum 4,000 psi.
- I.** Synthetic Web Slings: ANSI/ASME B30.9 – New or like new condition, free of defects.

PART 3 - EXECUTION

0.1 PREPARATION

- A.** Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation and temporary ductbank support and protection system operations.
 - 1. Shore, support, and protect utilities encountered in accordance with applicable specifications. In the absence of specific requirements regarding support and protection of existing utilities, Contractor shall contact the utility owner to obtain the necessary information regarding supporting and protecting their utility and design and install a support and protection system acceptable to the utility owner.
- B.** The engineer shall inspect all materials used in the temporary support system and verify that the materials are free of defects and deficiencies.
- C.** Expose and clean the existing ductbank using extra care to prevent damage and avoiding any excavation of soil supporting the underside of the ductbank.
- D.** Perform Existing Condition Survey.
- E.** Perform Photographic and/or Video Survey.
- F.** Provide instrumentation to monitor all movements of the ductbank during the construction. Monitor the movements in accordance with the engineer's approved monitoring plan.

0.2 INSTALLATION

- A.** Install temporary ductbank support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Engineer and authorities

having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

- B.** Locate temporary ductbank support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces is not impeded.
- C.** The contractor shall take care to protect adjacent facilities from damage while installing excavation support and protection systems. It shall be the responsibility of the contractor to repair any damages caused by installing excavation support and protection systems.
- D. SUPPORT BEAMS AND HANGERS**
 - 1. Provide steel or timber beams of the size as determined by the approved design calculations.
 - 2. Connections of the hangers to the support beams and ductbanks shall be detailed and constructed in accordance with the approved shop drawings.
- E. SHORING TOWERS**
 - 1. Shoring towers shall be installed in accordance with the approved shop drawings.
- F. BRACING**
 - 1. Bracing: Provide adequate bracing of the temporary supports to prevent any deflection or horizontal movements of the temporary supports during the execution of the work.

0.3 INSPECTION

- A.** After the temporary ductbank shoring system has been installed, and prior to undercutting any existing support of the ductbank, the Engineer shall inspect the shoring system to verify that it is in conformance with the intent of the approved shop drawings.

0.4 MONITORING

- A.** Perform monitoring as required by the Construction Monitoring Plan.

0.5 REMOVAL AND REPAIRS

- A.** After permanent support of the ductbank has been established, remove temporary ductbank support and protection systems.

- B.** The Engineer shall perform a post-construction survey of the ductbank prior to backfilling.
- C.** Perform ductbank repairs as directed by Engineer.
- D.** Repair or replace, as directed by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems. Any damage to adjacent work caused by construction activities shall be repaired to the satisfaction of the Engineer at the Contractor's expense.

PART 4 - MEASUREMENT AND PAYMENT

0.1 MEASUREMENT

- A.** No separate measurement will be made for work under this section, but all costs in connection therewith shall be included in the Contract Lump Sum price for Item 02265 TEMPORARY DUCTBANK SUPPORT AND PROTECTION. All preparation and incidental work necessary to accomplish the installation will be considered incidental to the Lump Sum price.

0.2 PAYMENT

- A.** Payment for excavation support and protection will be made at the Contract lump sum prices as specified above.

0.3 PAYMENT ITEMS

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
02265	TEMPROARY DUCTBANK SUPPORT AND PROTECTION.	LS

END OF SECTION